

We claim:

1. In a laser scanning system for determining frame or unibody alignment of a vehicle including at least one reflective laser beam target adapted for placement in a known relationship relative to a selected vehicle reference point, laser scanning apparatus comprising a laser assembly operable to direct a laser beam toward said target, and a detector assembly for receiving a target-reflected laser beam from said target, the improvement which comprises a detector having a substantially parabolic reflective surface oriented to reflect said target-reflected laser beam to the focal point of said substantially parabolic surface, and a detector located substantially at said focal point.

2. The system of claim 1, said laser assembly including a pair of laser units, each laser unit comprising a pair of vertically spaced apart laser-generating devices.

3. The system of claim 1, said laser assembly being stationary, there being a pair of rotating mirrors respectively located on opposite sides of the laser assembly.

4. The system of claim 3, said laser assembly and said rotating mirrors located within a housing presenting transparent wall surfaces for passage of said laser beams therethrough.

5. The system of claim 3, each of said rotating members comprising an upright mirror having a relatively wide reflective surface and a relatively narrow reflective edge.

6. The system of claim 1, there being an opening extending through said parabolic reflective surface, said laser assembly oriented for directing said laser beam through said opening.

7. The system of claim 6, said detector assembly comprising a pair of substantially parabolic reflective surfaces, each of said substantially parabolic reflective surfaces having an opening therethrough, said laser assembly including structure for directing a respective laser beam through each of said openings.

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8. The system of claim 7, each of said substantially parabolic reflective surfaces having a pair of vertically spaced apart openings therethrough, said laser assembly including structure for directing a laser beam through each of said openings.

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9. The system of claim 8, said laser assembly operable to direct each of said laser beams through a 360° sweep.

10. The system of claim 1, including a plurality of reflective laser beam targets each adapted for placement on said vehicle at predetermined reference points.

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11. The system of claim 10, said targets being individually coded.

12. In a method of laser scanning for determining frame or unibody alignment of a vehicle including the steps of placing at least one reflective laser beam target in a known relationship relative to a selected vehicle reference point, laser scanning said target by directing a laser beam from a source toward said target, and detecting a target-reflected laser beam from said target, the improvement which comprises directing said laser-reflected beam onto a substantially parabolic reflective surface oriented to reflect the target-reflected laser beam to the focal point of the substantially parabolic surface, and detecting the laser beam from the substantially parabolic reflective surface using a detector located substantially at said focal point.

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13. The method of claim 12, said laser assembly including a pair of laser units, each laser unit comprising a pair of vertically spaced apart laser-generating devices, there being a substantially parabolic reflective surface associated with each of said pair of laser-generating devices each oriented to reflect target-reflective laser beams to the focal point thereof, said method comprising the steps of directing each pair of said laser beams
5 towards said target, and directing each pair of the laser-reflected beams onto the associated substantially parabolic reflective surface, and detecting each pair of the laser beams using a detector located substantially at the focal point of the associated substantially parabolic reflective surface.

10 14. A laser scanning apparatus for determining frame or unibody alignment of a vehicle comprising:

- a housing;
- a laser assembly located within said housing;
- 15 a pair of upright, rotatable mirrors within said housing and on opposite sides of said laser assembly,
- said laser assembly and mirrors operable to a direct laser beam toward a vehicle-mounted reflective target; and
- a detector assembly for receiving target-reflected laser beams from said target, said
20 detector assembly located within the housing and comprising substantially parabolic reflective surface oriented to reflect said target-reflected laser beam to the focal point of the substantially parabolic reflective surface, and
a detector located substantially at said focal point.

25 15. The apparatus of claim 14, said laser assembly including a pair of laser sources, each laser source comprising upper and lower, vertically spaced apart laser sources operable to direct respective, vertically spaced apart laser beams towards said vehicle-mounted target, said detector assembly including a pair of said substantially parabolic reflective surfaces each associated with corresponding upper and lower laser
30 sources.